

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

**(19) World Intellectual Property Organization
International Bureau**



(43) International Publication Date
16 January 2003 (16.01.2003)

PCT

(10) International Publication Number
WO 03/004819 A3

(51) International Patent Classification⁷: E21B 23/08

RING, Lev [RU/US]; 14126 Heatherhill Place, Houston, TX 77077 (US). **BRISCO, David, Paul** [US/US]; 405 Westridge Drive, Duncan, OK 73533 (US).

(22) International Filing Date: 26 June 2002 (26.06.2002)

(74) Agents: MATTINGLY, Todd et al.; Haynes & Boone, LLP, Suite 4300, 1000 Louisiana Street, Houston, TX 77002-5012 (US).

(25) Filing Language: English

(81) Designated States (nationwide): AH, AG, AL, AM, AT, AU

(26) Publication Language: English

AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

(30) Priority Data:
60/303,740 6 July 2001 (06.07.2001) US

CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, IT, LI, LV, MA, MD, MG, MK, MN, MW

(71) **Applicant (for all designated States except US): ENVIRONMENTAL
TRE GLOBAL TECHNOLOGY [US/US]; 16200 A.
Park Row, Houston, TX 77084 (US).**

MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

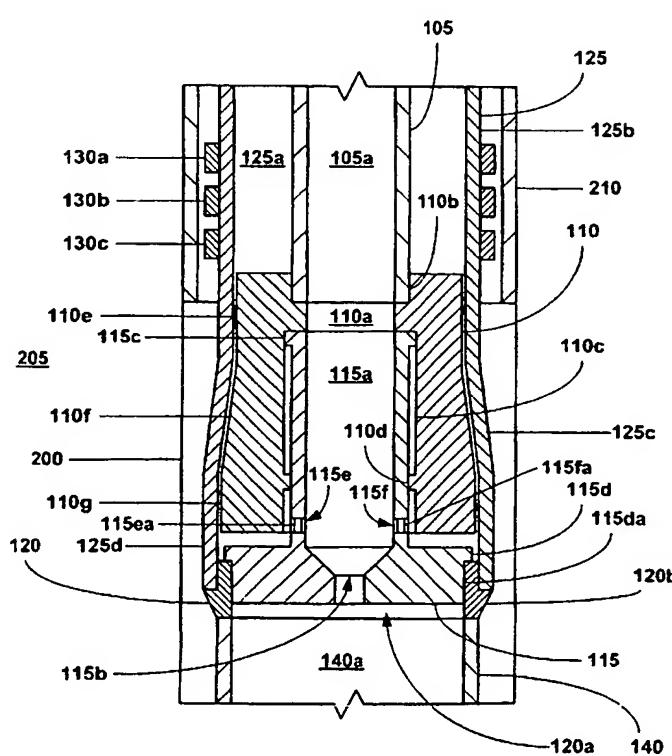
(72) **Inventors;** and
(75) **Inventors/Applicants (for US only):** COOK, Robert,
Lance [US/USI: 934 Caswell Court, Katy, TX 77450 (US)]

(34) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, EL, FR,

[Continued on next page]

(54) Title: LINER HANGER

(57) Abstract: An apparatus and method for forming or repairing a wellbore casing (210) by radially expanding a tubular liner (125).



WO 03/004819 A3



GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

... with amended claims

(88) Date of publication of the international search report:
22 May 2003

Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv)) for US only

Date of publication of the amended claims: 23 October 2003

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

AMENDED CLAIMS

[received by the International Bureau on 28 February 2003 (28.02.03);
original claims 1 and 5 replaced by amended claims 1 and 5; original claims 3 and 7 cancelled;
new claims 8-10 added; remaining claims unchanged (3 pages)]

1. A method of coupling a radially expandable tubular member to a preexisting structure, comprising:
positioning the tubular member within the preexisting structure;
injecting fluidic materials into the tubular member;
sensing the operating pressure of the fluidic materials;
radially expanding and plastically deforming the tubular member into contact with the preexisting structure when the sensed operating pressure exceeds a predetermined amount;
radially expanding and plastically deforming the tubular member using a tubular expansion cone when the sensed operating pressure exceeds the predetermined amount; and
movably coupling a tubular shoe to the tubular expansion cone.
2. The method of claim 1, wherein sensing the operating pressure includes:
sensing the operating pressure of the fluidic materials within the tubular member.
3. Cancelled
4. An apparatus for coupling a radially expandable tubular member to a preexisting structure, comprising:
a tubular support member including a first passage;
a tubular expansion cone coupled to the tubular support member defining a second passage and including an internal flange;
a tubular shoe movably received within the second passage of the tubular expansion cone defining one or more radial passages and a valveable passage fluidically coupled to the first passage and including an external flange for engaging the internal flange;
one or more pressure relief valves positioned in corresponding ones of the radial passages; and
an expandable tubular member movably coupled to the tubular expansion cone.
5. A system for coupling a radially expandable tubular member to a preexisting structure, comprising:
means for positioning the tubular member within the preexisting structure;
means for injecting fluidic materials into the tubular member;
means for sensing the operating pressure of the fluidic materials;

means for radially expanding the tubular member into contact with the preexisting structure when the sensed operating pressure exceeds a predetermined amount; and
means for radially expanding and plastically deforming the tubular member using a tubular expansion cone when the sensed operating pressure exceeds the predetermined amount; and
means for movably coupling a tubular shoe to the tubular expansion cone.

6. The system of claim 5, wherein the means for sensing the operating pressure includes:
means for sensing the operating pressure of the fluidic materials within the tubular member.

7. Cancelled

8. A method of coupling a radially expandable tubular member to a preexisting structure, comprising:
positioning the tubular member within the preexisting structure;
injecting fluidic materials into the tubular member;
sensing the operating pressure of the fluidic materials;
radially expanding and plastically deforming the tubular member into contact with the preexisting structure when the sensed operating pressure exceeds a predetermined amount; and
radially expanding and plastically deforming the tubular member by displacing an expansion member in the longitudinal direction relative to the tubular member when the sensed operating pressure exceeds the predetermined amount.

9. A system for coupling a radially expandable tubular member to a preexisting structure, comprising:
means for positioning the tubular member within the preexisting structure;
means for injecting fluidic materials into the tubular member;
means for sensing the operating pressure of the fluidic materials; [and]
means for radially expanding the tubular member into contact with the preexisting structure when the sensed operating pressure exceeds a predetermined amount; and
means for radially expanding and plastically deforming the tubular member by displacing an expansion member in the longitudinal direction relative to the tubular member when the sensed operating pressure exceeds the predetermined amount.

10. An apparatus for coupling a radially expandable tubular member to a preexisting structure, comprising:
a support member; and

an expansion device movably coupled to the support member comprising:
one or more expansion surfaces adapted to be displaced in the longitudinal direction relative to the support member for engaging and radially expanding and plastically deforming the expandable tubular member; and
one or more pressure sensing elements coupled to the expansion surfaces for controlling the longitudinal displacement of the expansion surfaces as a function of the sensed operating pressure within the expandable tubular member.